McKinley High

Energy Smart Schools Program

McKinley High School

Rebuild America

Hawaiian Electric Company, Inc.

DBEDT
THE DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM
STATE OF HAWAII

Ms. Sophia Hu's Class

McKinley High School

Program Goals

1. To increase awareness in Hawaii's schools and communities on the benefits of using energy efficient lighting.

2. To show schools and businesses how to decrease their electricity costs while improving the quality of lighting.

3. For students to gain career and life skills.

Student Activities

Throughout the year we participated in various activities to complete our goals.

Guest speakers from HECO gave us a brief background on electricity, energy efficiency, types of lighting, and presentation skills.

Student Activities

Field trip to Kahe Power Plant to learn how a power plant works and how electricity is distributed to our homes.

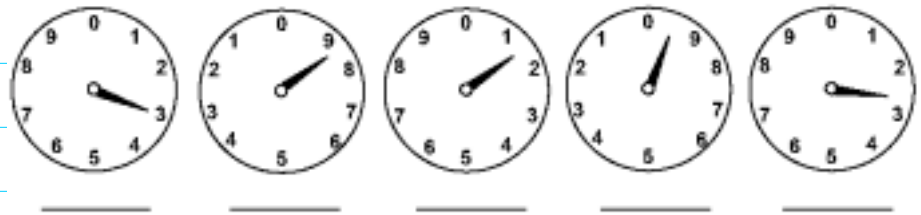
Student Activities

Built motors and…

…had the opportunity to see a demonstration hydrogen fuel cell.

Student Activities

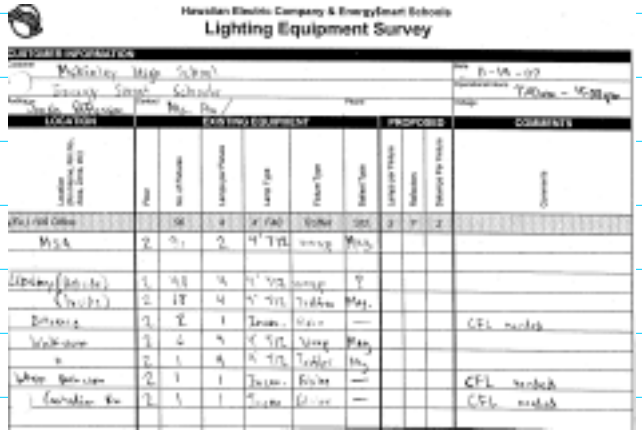
Learned how to read our electric meters and bills. Figured out the amount of kWh and cost to operate appliances.



Learned about different types of fluorescent lighting and conducted lighting audits in our school classrooms and library

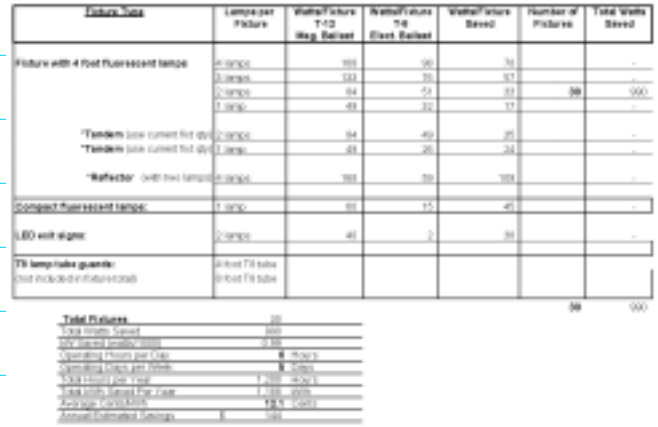
Student Audit

We counted the number of fixtures, number of lamps per fixture, and recorded the lamp/ballast type (T-12/Magnetic or T-8/Electronic).



Hawaiian Electric Company & EnergySmart Schools

Lighting Equipment Survey



We typed in all this information into an Excel spreadsheet on the computer and calculated how much energy and money we would save by changing the types of the lamps and ballasts inside the fixtures.

McKinley High School

School Background

School established in 1865 in downtown

School established in present location in 1923

Buildings range in age from 10 to 80 years old

What type of fluorescent lights are currently in the classroom?

The types of fluorescent lights we have in our classrooms are the T-12 lamps with magnetic ballasts; usually placed in a wrap or troffer type of fixture.

What is the average number of fixtures in a classroom?

The average amount of fixtures per classroom is 30.

Gadgets

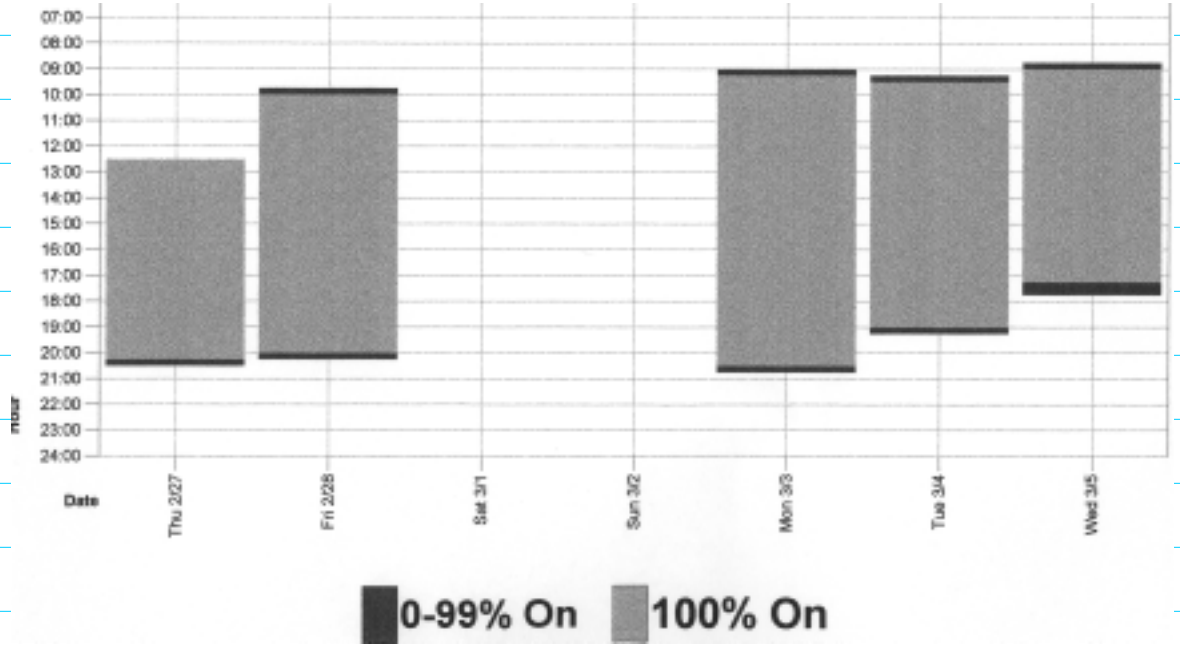
WE USED GADGETS SUCH AS:

FLICKER CHECKER: A tool used to check the fixture's ballast type. (magnetic, electronic)

LIGHT METER: A tool used to measure amount of light coming from the fixture. (foot candles)

Gadgets

LIGHT LOGGER: A tool placed in the fixture to record the amount of time the lights are on. (burn hours)



MS-9 Audit

Total Fixtures	30	
Total Watts Saved	**990**	
kW Saved (watts/1000)	0.99	
Operating Hours per Day:	**6**	Hours
Operating Days per Week	**5**	Days
Total Hours per Year	1,200	Hours
Total kWh Saved Per Year	1,188	kWh
Average Cents/kWh	**12.1**	Cents
Annual Estimated Savings	**$ 144**	

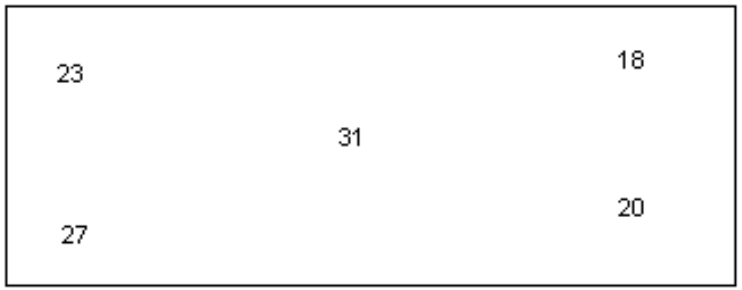
Based on a 40 week school year

McKinley High School

MS-9 Audit

Light Meter Readings

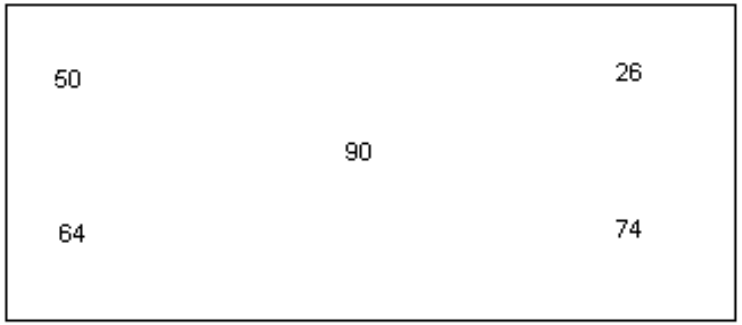
MS-9's lighting meter (T12 lamps)



Total:
23+27+31+18+20=119

Average:
119/5=23.8

New Classroom's lighting meter (T8 lamps)



Total:
50+64+90+26+74=304

Average:
304/5=60.8

Library Audit

Total Fixtures	125	
Total Watts Saved	**8,686**	
kW Saved (watts/1000)	8.69	
Operating Hours per Day:	**8**	Hours
Operating Days per Week	**5**	Days
Total Hours per Year	1,600	Hours
Total kWh Saved Per Year	13,898	kWh
Average Cents/kWh	**12.1**	Cents
Annual Estimated Savings	**$ 1,682**	

Based on a 40 week school year

McKinley High School

School Audit

Total Fixtures	2,844	
Total Watts Saved	**111,019**	
kW Saved (watts/1000)	111.02	
Operating Hours per Day:	8	Hours
Operating Days per Week	5	Days
Total Hours per Year	1,600	Hours
Total kWh Saved Per Year	177,630	kWh
Average Cents/kWh	12.1	Cents
Annual Estimated Savings	**$ 21,493**	

Based on a 40 week school year

How did we do the entire school audit?

We counted the lights in our classrooms then figured out the average amount of fixtures per classroom. Then we multiplied the average number of fixtures per classroom by the number of classrooms in the school. This gave us an estimated number of lights in our school.

McKinley High School

School Audit

Cost to retrofit classrooms

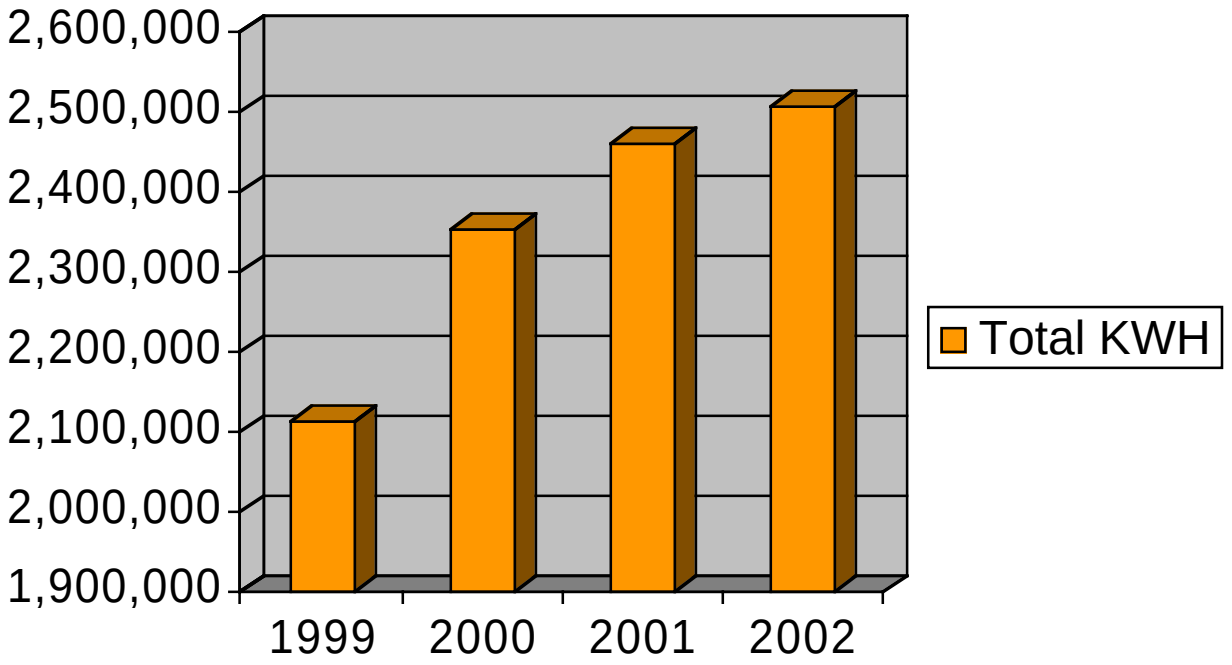
Totals	2844	$ 93,500.14	
Sales Tax		$ 3,895.22	
PUC Tax		$ 6,218.69	
Total Estimate *		$ 103,614.05	
HECO REBATE		$ 18,089.60	
Net Project Cost		**$ 85,524.45**	
ESTIMATED ANNUAL SAVINGS		$ 21,493.28	
Estimated Payback Period		**$ 3.98**	**Years**

MHS Electric Bill

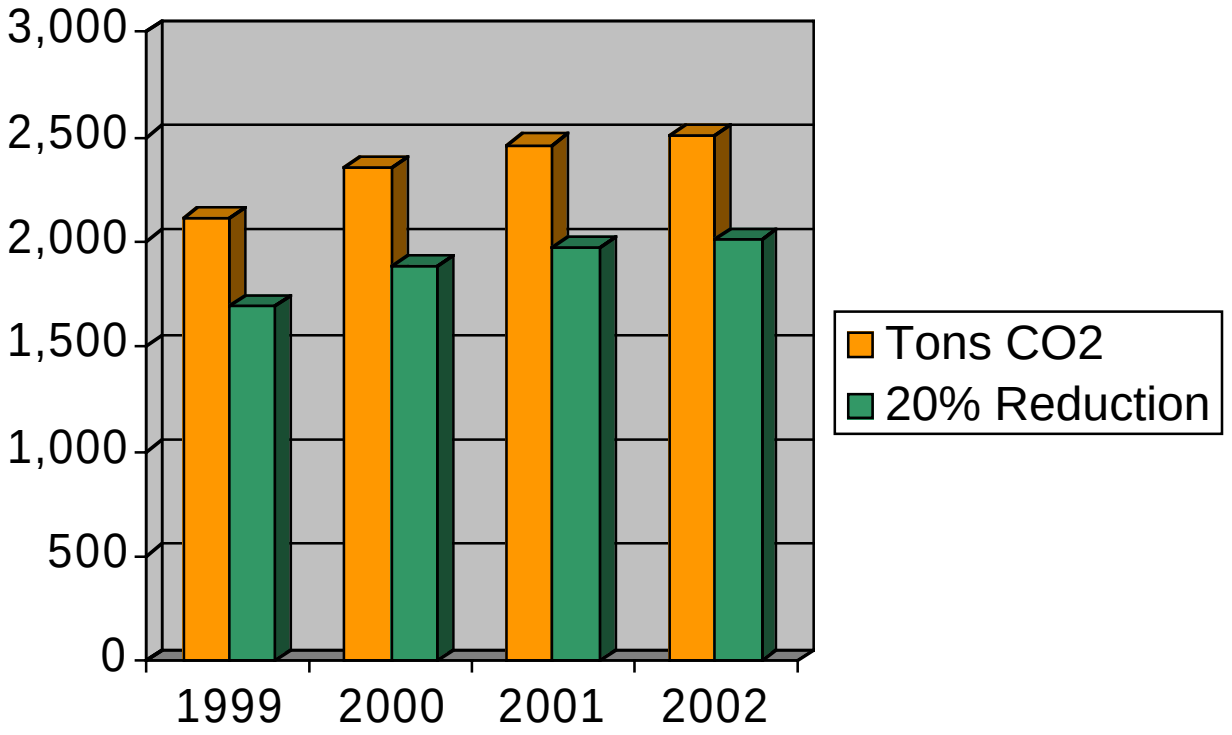
Year	Total Bill Amount		Total With Energy Efficient Lighting	Savings
2002	$ 304,886		$ 243,909	$ 60,977
2001	$ 367,657		$ 294,126	$ 73,531
2000	$ 294,913		$ 235,931	$ 58,982
1999	$ 229,016		$ 183,213	$ 45,803

Total savings is estimated at 20% if the school retrofitted to T-8 lamps/electronic ballasts

Total kWh Used



CO_2 Released



Benefits of T-8 vs. T-12

T-8 lamps (with electronic ballasts) are more energy efficient than the T-12 lamps (with magnetic ballasts) saves money on electricity costs. It may take a little while to pay off the cost of retrofitting but you could save money in the long run.

Money saved could be used to fund various school programs and activities. Schools could use the extra cash to fix anything that needed repair. They could replace older textbooks or purchase new computers and equipment.

Installing T-8 lamps could reduce maintenance costs because the lamp life is longer so custodians will spend less time on changing out burnt out lamps.

Benefits of T-8 vs. T-12

T-8 lamps can provide better lighting and truer colors in our classroom

Installing T-8 lamps could reduce maintenance costs because the lamp life is longer so custodians will spend less time on changing out burnt out lamps.

Other Ways To Save $

How else do we save money on our school's electricity bill?

- **Turn off the lights when not in use**
- **Turn off the AC and open up the windows on cooler days**
- **Turn off computer monitors when you are away from your computer**

Current Status

Completing Small Business Audits!

Generating Reports Of Data!

Presenting Audit Reports!

For more Information contact:

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